

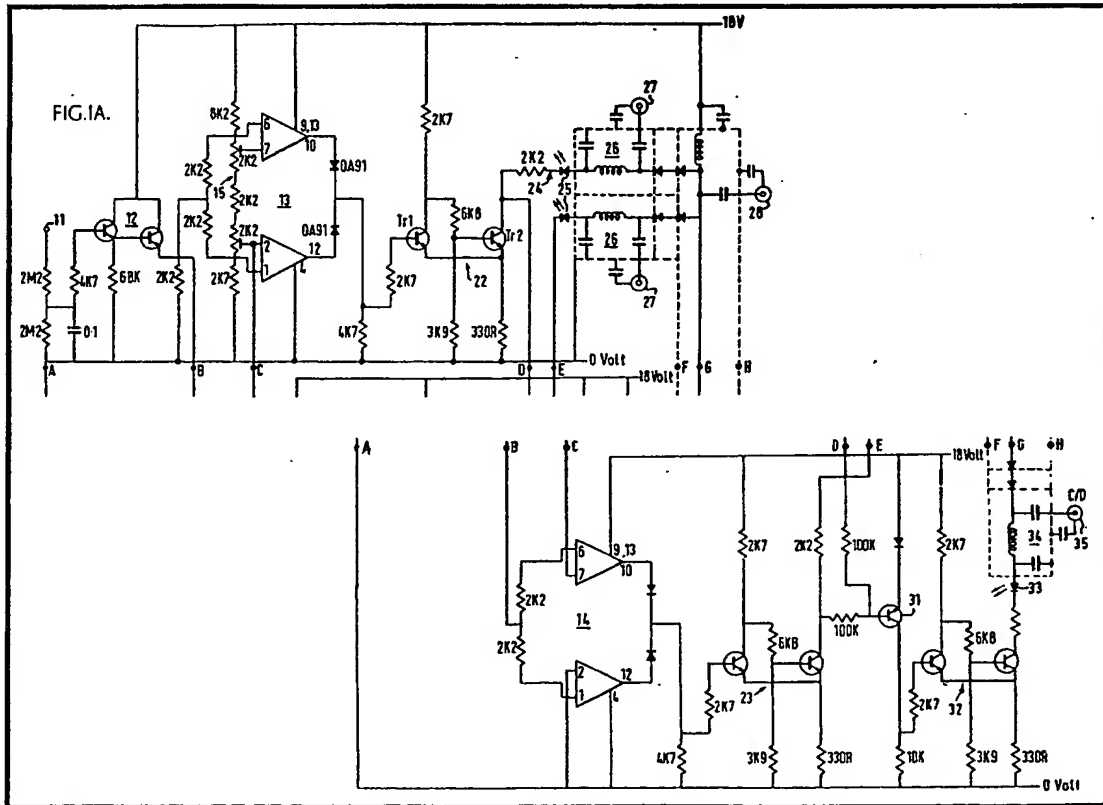
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(54) Aerial direction selectors

(57) An aerial direction selector for use with a radio receiver in which a tuner generates a voltage at terminal 11 varying in response to the frequency to which it is tuned, comprises means for connection to an aerial system and means (13 to 16) responsive to the voltage to cause the aerial system to receive selectively in a desired direction. Appropriate fixed aeriels can be connected to an output in response to the voltage. Or a rotatable aerial can be rotated in response to the voltage. Level detectors 13 and 14 switch aeriels B and A via P1N diodes to output 28 according to tuning voltages in channel, B or A groups and the aerial in use is

indicated by LED's 25. If the received signal corresponds to a third group of channels neither detectors 13 or 14 responds and a bistable 32 switches aerial 35 via P1N diodes to the output 28.



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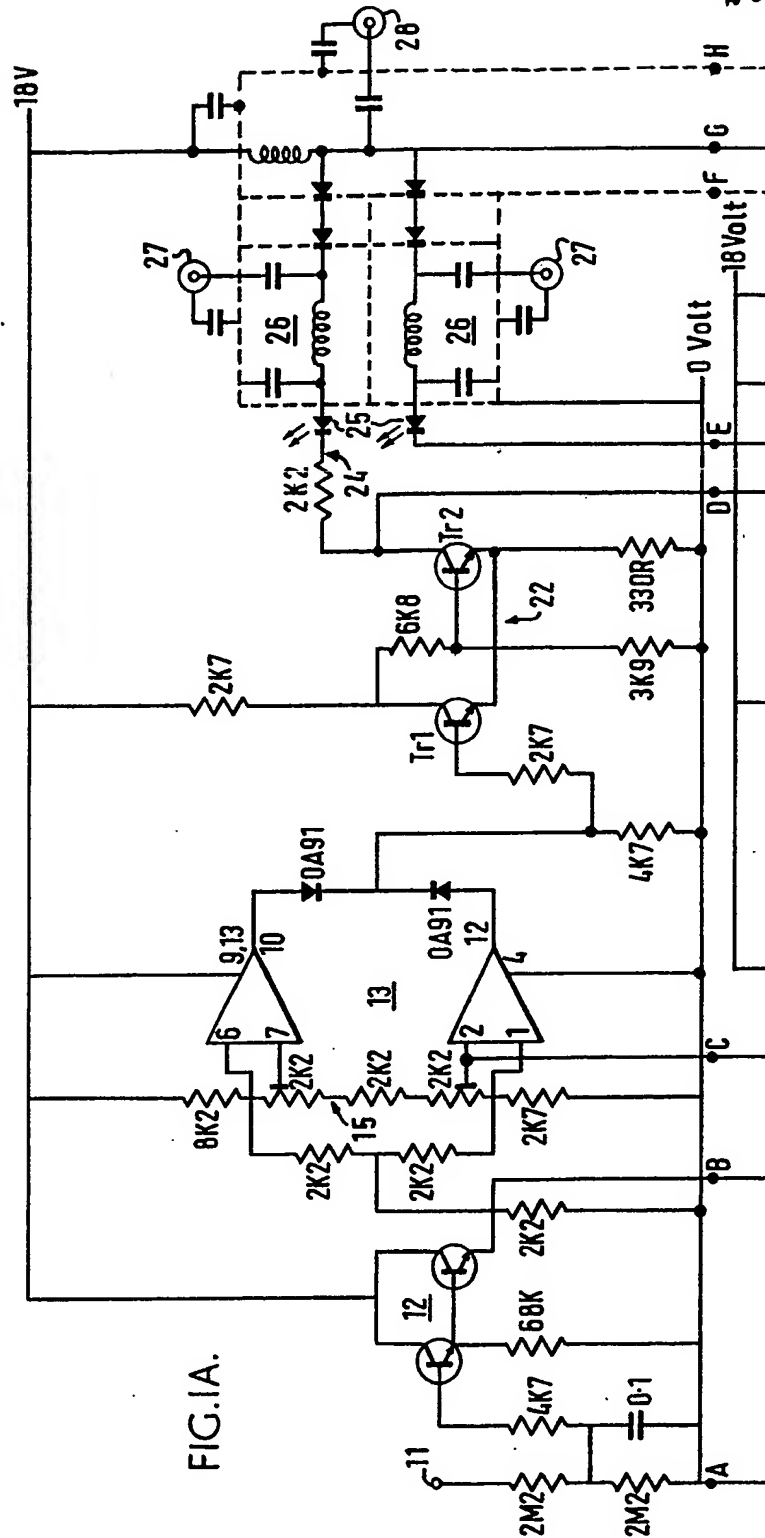
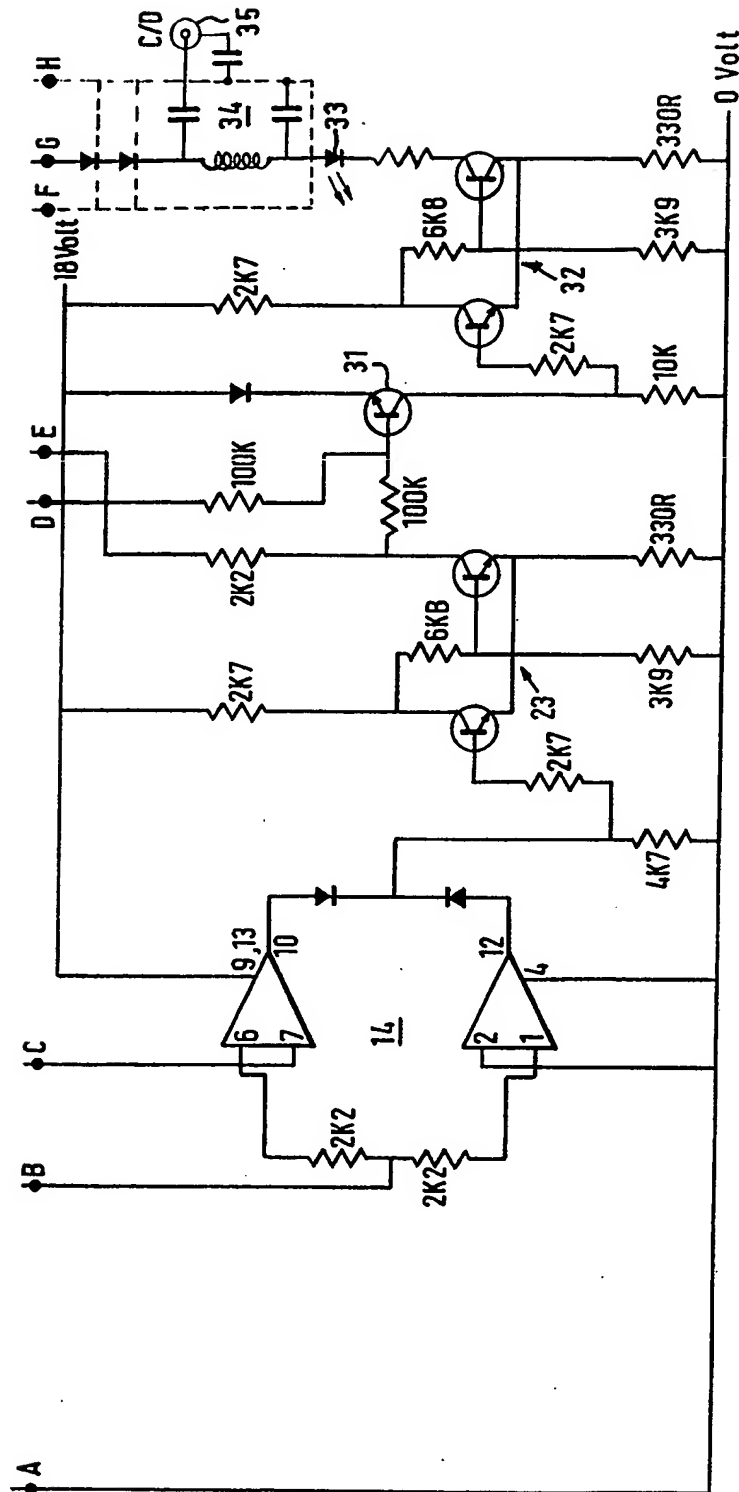


FIG. 1B.



SPECIFICATION

Improvements in or relating to aerial direction selectors

5 This invention relates to an aerial direction selector. When kilohertz frequencies were used for the transmission of information by radio, non-directional areas could be used, and a single aerial was sufficient to pick up signals from a plurality of stations. With higher transmission frequencies in the megahertz range, directional aerals have become necessary and in areas where signals can be received from a plurality of stations it has been necessary to provide a plurality of aerals in the appropriate directions or to rotate an aerial to point in the desired direction.

10 Although it would be possible to connect the appropriate aerial into a set when tuning it to a particular station, or to rotate an aerial to the appropriate direction, it would be convenient to have the aerial direction automatically selected when the set is tuned to a particular station.

15 According to the invention there is provided an aerial direction selector for use with a radio receiving device in which a tuner generates a voltage varying in response to the frequency to which it is tuned, the selector comprising means for connection to an aerial system and means responsive to said voltage to cause the aerial system to receive selectively in a desired direction.

20 The aerial system may be caused to receive selectively in a desired direction by switching between different aerial elements in the system, or by rotating an aerial to point in the desired direction.

25 An example of the invention will now be described with reference to the accompanying drawings in which Figs. 1a and 1b together make up a circuit diagram of an aerial direction selector device for use with a television receiver which produces a voltage which varies according to the station to which it is tuned.

30 It is usual for modern television sets with pre-set tuning to provide such a voltage, the tuning of each channel being adjusted by the position of a tap on a potentiometer connected across a potential difference, the tuning of the set being achieved by connecting one and disconnecting all the other taps of the potentiometers to a tuning output line. Besides applying this tuning output line to the tuning circuit of the television set, it is also applied to the circuit to be described below. The variation of tuning voltage plotted against channel setting and vision carrier frequency is given in the Mullard technical extract for their E.L.C. 1043 television tuner. The voltage varies from about 1 volt at channel 21 approximately linearly to about 28 volts at channel

65 68. Channel 21 corresponds to 470 MHz and

Channel 68 to about 845 MHz.

The input terminal 11 connected to the tuning output line feeds through a resistor 2M2 across another 2M2 resistor and 0.1

70 microfarad capacitor in parallel and through a 4 K7 resistor to a transistor Darlington Pair 12 to provide a high impedance input so that the circuit of Fig. 1 does not upset the tuning of the television set. The output of the Darlington Pair 12 is applied across a 2K2 resistor through four separate input lines each containing a 2K2 resistor to pins 1 and 6 of two threshold detectors 13 and 14. Each detector 13 and 14 comprises two operational amplifiers in one integrated circuit. A potential divider 15 is connected across the 18 volt power supply for the selector circuit and pins 7 and 2 of detector 13 are connected to the taps of variable potentiometers in the divider 15 so that the detector 13 responds to an input voltage corresponding to group B television channels 39 to 53. Pin 7 of detector 14 is connected to pin 2 of detector 13 and pin 2 of detector 14 is connected to earth so that detector 14 responds to group A television channels 21 to 34. The variable potentiometers in the divider 15 allow a variation of the response of the threshold detector by up to two channels.

95 The outputs of the threshold detectors 13, 14 are applied to corresponding bistable circuits 22, 23 each formed by a further pair of transistors, and each bistable circuit has an output circuit 24 comprising a 2K2 resistor, a light emitting diode 25 to show the state of the circuit, and an aerial switching circuit 26 including an aerial input socket 27 and p.i.n. diodes which exhibit an impedance to U.H.F. signals in response to the direct current passing through them. The output of the aerial switching circuits 26 are connected in common to a single aerial output socket 28 which is connected to the aerial input socket in the television receiver.

110 If the input from the tuning circuit applied to terminal 11 corresponds to a channel in group B, the detector 13 will respond, switching off the first transistor in its bistable circuit 22 and switching on the second transistor, whose output will cause the light emitting diode 25 to emit light and the p.i.n. diodes to provide substantially zero impedance for signals from the aerial corresponding to group B channels to the aerial output socket 28. On the other hand, the detector 14 will not respond to the input signal, so that the second transistor of its bistable circuit will be switched off and the light emitting diode of its aerial switching circuit will not emit light and a high impedance will be provided by the p.i.n. diodes between the socket connected to the aerial for group A channels and the aerial output socket 28.

125 There is a third group of channels 48 to 68, known as group C/D. It is not necessary

to provide a separate threshold detector for this group of channels, since an input signal corresponding to a channel in this group will not (subject to a slight overlap with group B) cause either detector 13 or detector 14 to respond. The second transistors of the bistable circuits of both threshold detectors will therefore be switched off, and this state is sensed by transistor 31 connected to the outputs of both said second transistors, and this transistor 31 feeds another bistable circuit 32 whose second transistor is switched on in response to the switching off of the second transistors of the other two bistable circuits 22, 23 in order to cause a light emitting diode 33 to emit light and the p.i.n. diodes of an aerial switching circuit 34 to provide a substantially zero impedance between the aerial socket 35 for the group C/D channels to the aerial output socket 28.

It is possible to simplify the circuit of Fig. 1 when it is desired to switch between different aerials according to the presence or absence of an input from the tuning circuit of the television set in one group of channels. If this one group of channels is group B, the aerial selector circuit can be restricted to that shown in Fig. 1a, with the additional modification that the 2K7 collector resistor of the first transistor of the bistable circuit 22 connected to detector 13 is replaced by a 2K2 resistor connected to the light emitting diode of the switching circuit for the aerial arranged to receive signals other than signals in group B channels.

The illustrated circuit is arranged to connect individual fixed aerials directed at transmitters which transmit signals in the appropriate groups. It is possible to have a single aerial for receiving signals from different transmitters and a rotating device for directing the aerial towards the appropriate transmitter in response to the input from the tuning circuit of the television set. The resistance of a potentiometer varies with the direction of the aerial and this potentiometer is connected in a bridge containing another resistor whose value depends on the states of the bistable circuits in the arrangement described above. The aerial is rotated until the bridge balances, and the potentiometer values are selected so that the bridge balances when the aerial is directed to receive signals from the appropriate transmitter.

The selector may be used in conjunction with a receiver or it may be incorporated in the tuner of the receiver. In the latter case the receiver will be provided with a plurality of aerial input sockets in place of the single aerial input of a standard receiver.

CLAIMS

1. An aerial direction selector for use with a radio receiving device in which a tuner generates a voltage varying in response to the

frequency to which it is tuned, the selector comprising means for connection to an aerial system and means responsive to said voltage to cause the aerial system to receive selectively in a desired direction.

2. A selector as claimed in Claim 1 wherein said means responsive to the tuner voltage provides a highly conducting path for received signals to an output from an input adapted for connection to an aerial pointing in said desired direction.

3. A selector as claimed in Claim 1 wherein said connection means comprises terminals for connection to respective aerials and the means responsive to the tuner voltage provides a conductive path between a selected terminal and an output terminal.

4. A selector as claimed in Claim 1 wherein said connection means comprises a terminal for connection to an aerial which can be rotated and the means responsive to the tuner voltage comprises means to cause said aerial to be rotated to point in the desired direction.

5. A selector as claimed in any one of Claims 1 to 4 wherein said means responsive to the tuner voltage comprises a threshold detector, a bistable circuit connected to the output of said detector, and means responsive to the state of the bistable circuit to cause the aerial system to receive selectively in a desired direction.

6. A selector as claimed in Claim 5 comprising a light emitting diode for indicating the state of said bistable circuit.

7. A selector as claimed in Claim 2 or any claim dependent thereon wherein said means for providing a conductive path comprises a p.i.n. diode.

8. An aerial direction selector substantially as herein described with reference to and as illustrated in the accompanying drawings.

9. A radio receiver comprising a tuner adapted to produce a voltage whose magnitude depends on frequency to which it is tuned and aerial direction selector as claimed in any one of the preceding claims responsive to said voltage.

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